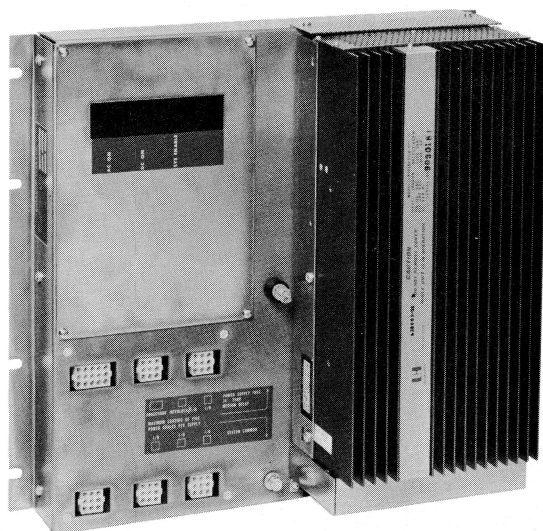


LOCAL POWER SUPPLY Cat. No. 1774-P1 (Series A, B, C)



Local Power Supply (Series C)

GENERAL

1.0 Introduction — The Local Power Supply (Cat. No. 1774-P1) is designed to provide DC power for the logic circuits in the PLC Processor and I/O Racks. One Local Power Supply is capable of powering 1 Processor and up to 4 "full" I/O Racks. (A "full" I/O Rack is defined as one containing 8 I/O Modules, each with 16 circuits.)

If a PLC controller contains more than 4 I/O Racks, a second Power Supply is necessary. The second Power Supply can be either a Remote Power Supply (Cat. No. 1778-P2), which supplies power to a maximum of 2 I/O Racks, or a Local Power Supply, which supplies power to a maximum of 5 I/O Racks.

The Local Power Supply which powers the PLC Processor is called the "main" Power Supply. A Local Power Supply, or a Remote Power Supply used in addition to the main Power Supply, in a Local I/O PLC controller, is referred to as an "auxiliary" Power Supply.

In Remote I/O PLC controller, the Local Power Supply is used only as the main Power Supply; additional power supplies for the Remote I/O Racks are generally Remote Power Supplies. (In certain instances where the current demands of the modules require it, a Local Power Supply may be used.)

In early 1977 the Series B Local Power Supply was introduced. Up until this time, all Local Power Supplies manufactured were the Series A version.

In May, 1979, the Series C Local Power Supply was introduced. The single feature that distinguishes the Series C Power Supply from the Series B is the provision of a new shutdown signal to Remote I/O Adapter Modules. (The Series A and B Power Supplies only provide a shutdown signal to the Processor.)

The Series B and C Power Supplies differ from the Series A Power Supply in several minor ways. The differences are called out explicitly in this Publication. Where information is common, it is discussed without distinctions.

SPECIFICATIONS

Input Voltage
120V AC 50/60 Hz (Series A, B, C)
220/240V AC 50/60 Hz (Series B, C only)

Input Voltage Range
120V AC 97 to 132V AC
220/240V AC 194 to 250V AC

Frequency Range
47 to 63 Hz (Series A, B)

Output Voltage, Rated Current
+5V DC 35A
+15V DC 4A
-15V DC 4A

Overcurrent Shutdown Limit
125% of rated current

Capability
1 Processor and 4 I/O Racks
or 5 I/O Racks

Input Power
500W (max.)

Fuses
7A (Series A, B, C)
0.25A (Series A only)

Ambient Temperature Rating
0° to 60°C (operational)
-40° to 85°C (storage)

Humidity Rating
5 to 95% without condensation

Dimensions (WHD)
10 x 17.5 x 8 inches
48.3 x 44.5 x 20.3 cm

Weight
37 lbs (16.8 kg)

2.0 Bulletin 1771 Compatibility — The Local Power Supply may be used to power Bulletin 1771 I/O Racks, regardless of size, but it **must** be a Series C, or later, version. (For more information, refer to the Bulletin 1771 Applications Paragraph 17.0.)

3.0 Power Input Specifications — The Local Power Supply requires input from an AC source. The Series A Power Supply utilizes 120V AC power, and functions properly as long as that power remains between 97 and 132V AC. The Series B, C, or later, Power Supplies utilize either 120V AC power or 220V AC power. The choice is made by means of jumper cables on a terminal strip. (Refer to the Paragraph, 120V AC vs. 220V AC Operation, later in this Publication, for details.)

When wired to utilize 120V AC power, the Series B or C Power Supply functions properly as long as the power remains between 97 and 132V AC. When wired to utilize 220V AC, the Series B or C Power Supply functions properly as long as the power remains between 194 and 250V AC.

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In cases where the AC line is especially unstable or subject to unusual variations, it is recommended that a constant voltage transformer having a sinusoidal output waveform be used between the AC line and the Local Power Supply input. A Sola CVS constant voltage transformer, or equivalent, can be used in this application. (For more information, refer to Publication 1774-914, AC Line Voltage Stabilization.)

The PLC Local Power Supply monitors the incoming AC line voltage for proper levels. If the AC source voltage goes below the minimum rated level for more than one-half cycle, the Power Supply generates a shutdown signal. This shutdown signal allows the Processor to end its operations in an orderly manner before the DC voltages drop to unacceptable levels for proper operation. (The Series A, B, and C Power Supplies provide a shutdown signal to the Processor, but the Series C also provides this signal to the Remote I/O Adapter Modules in the I/O Racks.)

As the AC source voltage rises to above the minimum rated level, the shutdown signal inhibits the Processor and Remote I/O Modules from operating until the DC voltages are within specifications. Only then may operations be resumed again.

4.0 Outputs — The electronics associated with the Local Power Supply monitor the DC voltage and current outputs for overvoltage, undervoltage, and overcurrent. If any such problems occur, the Power Supply automatically shuts down and remains off until they are corrected.

5.0 AC Input Connections — The AC input connections are made to a terminal strip on the Power Supply. Connection to the AC line is best accomplished by referring to the label attached to the terminal strip on the Supply. (See Figures 1 and 2.) L1 is the high side of the AC line (terminal No. 8). L2 is the low side (terminal No. 9). EQUIP GND is the ground (terminal No. 10).

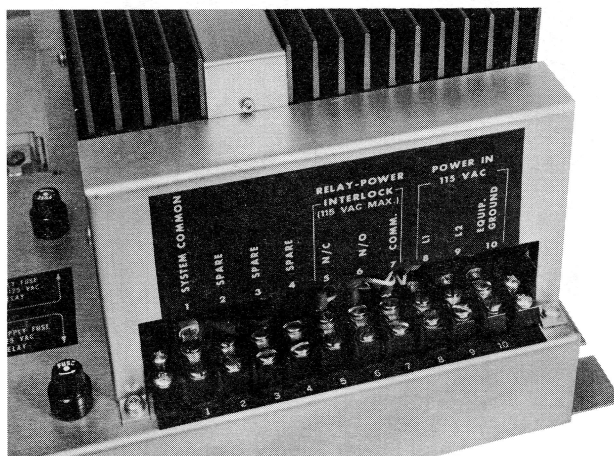


Figure 1 — Terminal Label, Series A Power Supply

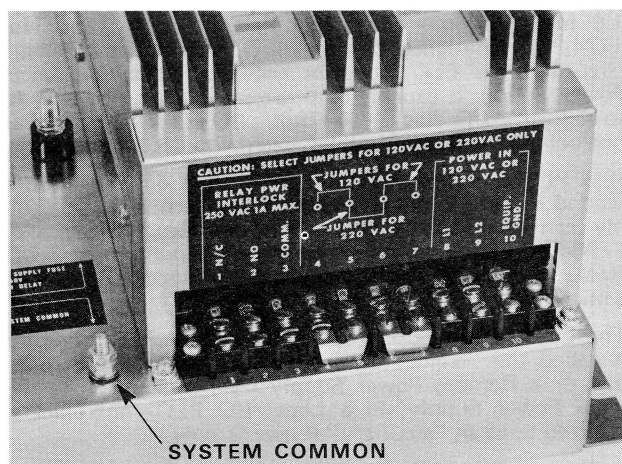


Figure 2 — Terminal Label, Series B and C Power Supply

6.0 Power Connections — There are 6 sockets on the Local Power Supply for power connections to the Processor and I/O Racks. (See Figure 3.) The Processor power cable fits only the upper left-hand plug socket. The I/O Power Cables (Cat. No. 1778-AC or 1778-AD) fit into any of the 5 other sockets. ¹

¹ As of this publication date, no specific information is available concerning changes to the I/O Power Cables caused by the Series C Supply. The design of these Cables will be changed to allow for an additional signal wire. However, it may be stated that the Cat. No. 1778-AC and -AD Cables will function properly with any Local I/O Rack (Cat. No. 1778-A1) or any Remote I/O Rack (Cat. No. 1778-A2) containing a Remote I/O Adapter Module (Cat. No. 1778-AR). Should a particular Bulletin 1774 Adapter Module be other than this Cat. No., contact your local Allen-Bradley representative.

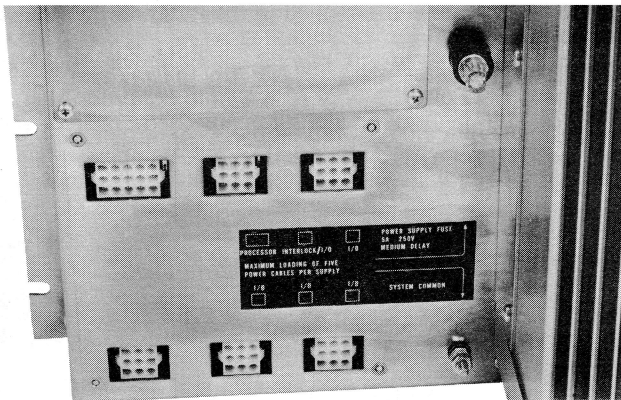


Figure 3 — Processor and I/O Sockets

All sockets are keyed to prevent improper connection.

Up to 5 I/O Power Cables can be connected to the available sockets. If a Power Supply Shutdown Cable is used, however, it must be connected to one of these sockets, and only 4 I/O Racks can then be connected to the Power Supply. (The Shutdown Cable socket is marked INTERLOCK/I/O.)

7.0 Local Shutdown Cable — The Local Power Supply Shutdown Cable (Cat. No. 1778-AP) is an optional 10-foot cable which may be used only with a Local I/O PLC programmable controller. The Cable is connected between the "main" Power Supply and the "auxiliary" Power Supply. (The Auxiliary may be a second Local or a Remote Power Supply.) The following functions are provided:

- A convenient means of shutting down both Power Supplies' DC power to all I/O Racks in the system. (This assumes that **both** are Local Power Supplies, Cat. No. 1774-P1, Series B, or later). The Interlock Bar or Switch on the Processor is used to cause the shutdown.
- A convenient means of restarting the PLC-controlled system after a momentary loss of power happening only at the "auxiliary" Power Supply. When the Cable is used, output DC power from the "main" Power Supply is automatically shut down also. (If the Cable is not used in this circumstance, the situation will be detected as a fault by the Processor and can only be cleared manually.) This feature applies only to Series A and C Supplies, **not** Series B.

Note carefully that the auxiliary power supply **cannot** be shut down by the Processor's Interlock Bar, or Switch, as described as the first function listed above, unless it is a Series B, or later, Local Power Supply.

Connect the Shutdown Cable between the sockets labeled INTERLOCK on the main Power Supply and on the auxiliary. (For details concerning the Shutdown Cable, see Publication 1774-945.)

Note: The Shutdown Cable functions as described on all Series A and C Supplies. With respect to the Series B, this function is dependent upon the revision level of the Power Supply Monitor Module (Cat. No. 1774-PJ). If the Module is a Revision D, or later revision, the Shutdown Cable functions as described. If the Module is a Revision A, B, or C, the Shutdown Cable may cause the main Power Supply to shut down inadvertently.

To identify the revision level, examine the component side of the Module. The serial number is stamped in black ink near an edge. Immediately after this number, an alphabetical letter is also stamped. This letter is the revision level. (Serial number 889 was the first Revision D.)

8.0 SYSTEM COMMON Terminal — If more than one Power Supply is used with the Local I/O PLC controller,

the SYSTEM COMMON terminals of each Supply must be tied together. This assures that the total PLC controller has the same reference common. On Series A Local Power Supplies, this connection is at terminal No. 1 on the terminal strip. (See Figure 1.) On Series B or C Local Power Supplies, this connection is to a separate lug labeled SYSTEM COMMON. (See Figure 2.)

In a Remote I/O PLC controller, the SYSTEM COMMON terminal on the main Power Supply should be left unconnected.

9.0 120V AC vs. 220V AC Operation — Series A Local Power Supplies are designed to operate only from 120V AC sources. Series B, C, or later, Local Power Supplies may utilize either 120V AC or 220V AC sources.

In order to use the Series B Local Power Supply, certain jumper connections must be made at the terminal strip. (Refer to Figure 2.) For 120V AC operation a jumper must be connected between terminals No. 4 and 5; and a jumper must be connected between terminals No. 6 and 7. For 220V AC operation, both jumpers should be connected between terminals No. 5 and 6.

Note: These jumpers are provided as standard with each Series B Power Supply. They are installed at the factory for 120V AC operation.

No jumper connections are necessary with the Series A Local Power Supply.

10.0 Internal Relay — In the Local Power Supply there is an internal relay having normally open (NO) and normally closed (NC) contacts. The relay is automatically de-energized when the PLC controller outputs are disabled. The normally open and normally closed contact connections to this relay are brought out to the external terminals labeled RELAY-POWER INTERLOCK. (See Figures 1 and 2.) This feature permits user-supplied devices, such as alarms or indicator lamps, to be controlled by the Local Power Supply operating status.

When the Local Power Supply is used as the main Power Supply, the status of the outputs control the relay. However, when the Local Power Supply is used as the auxiliary, this relay is **never** energized. (The power cable between the Local Power Supply and the Processor allows the energizing of the relay. Since the Processor power cable is never connected to the auxiliary power supply, the relay cannot be energized.)

CAUTION: When replacing a Series A with a Series B or C Power Supply, or vice versa, care must be taken **not** to exchange the wires solely on the basis of identically numbered terminals. Line voltage could be introduced onto Series A terminals No. 5 and 6 if the wires from Series B or C terminals 5, 6, and 7 were to be directly transferred. Damage to equipment would result. Read the terminal barrier labels carefully for proper terminal identification.

CAUTION: The internal relay in the main Power Supply can only be energized when the Mode Select Switch on the Processor is in the RUN-MONITOR position. Thus, changing the operating mode of the Processor from RUN-MONITOR to either TEST-MONITOR or PROGRAM LOAD affects the relay the same as removing AC input power from the Power Supply.

In order to take advantage of this feature, follow the terminal wiring shown in Figure 4.

No more than 1 ampere may be drawn through the contacts at any one time.

11.0 Status Indicators — There are several status indicators on the Local Power Supply. They are located on a module which is enclosed behind a square metal plate on

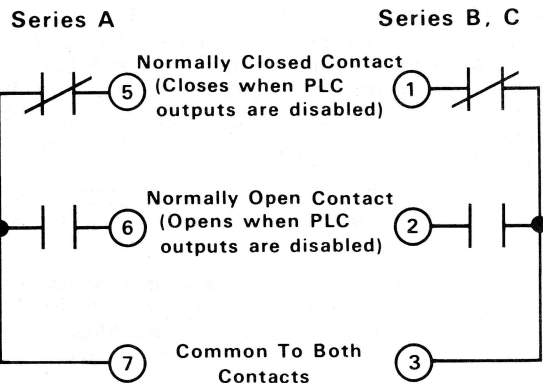


Figure 4 — Contacts for Internal Relay

the front left side of the Supply. The status indicators on the Series B and C Local Power Supplies are visible without removing the square metal plate. They can be seen through a window near the top of the plate. In order to observe the status indicators on the Series A Local Power Supply, the square plate must be removed. The plate is held in place with 4 screws.

12.0 Series B and C Indicators — There are 3 indicators on the Series B Supply's Power Supply Monitor Module (Cat. No. 1774-PJ): one labeled AC ON, one labeled DC ON, and one labeled SYS ENABLE. (See Figure 5.)

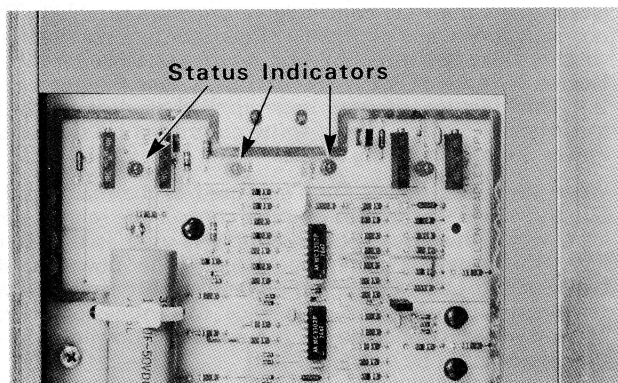


Figure 5 — Power Supply Monitor Module on Series B, C

When the indicator marked AC ON is illuminated, AC power is being applied to the Supply.

When the indicator marked DC ON is illuminated, logic power is applied to the PLC controller.

After the DC ON indicator is illuminated, there is approximately a 2-second delay; then the SYS ENABLE indicator should light. If the SYS ENABLE indicator does not light, the PLC Processor has not been enabled by the Power Supply, indicating that AC power is not within tolerances. When AC power returns to an acceptable level, the SYS ENABLE indicator will light, and the Processor will function normally.

13.0 Series A Indicators — There are 3 status indicators on the Series A Supply's Power Control Module (Cat. No. 1774-PC):

- ON
- OFF
- DELAY

Refer to Figure 6.

When the indicator marked ON (on the right side) is illu-

minated, logic power is applied to the PLC and the Processor is enabled.

When the indicator marked OFF (in the middle) is illuminated, the Power Supply is in a hold condition due to one of the failures previously mentioned: overvoltage, undervoltage, or overcurrent on AC or DC lines.

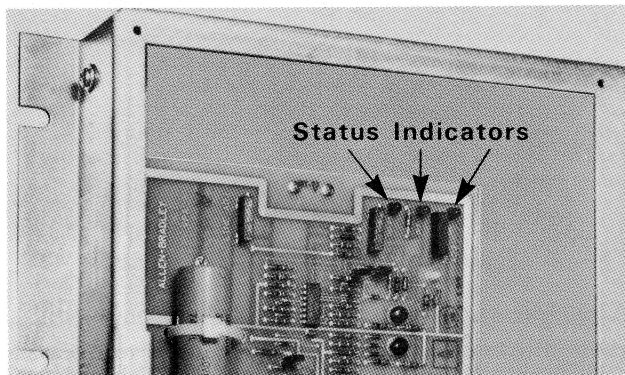


Figure 6 — Power Control Module on Series A

When the indicator marked DELAY (on the left side) is illuminated, the start-up internal time delay on the Power Control Module is timing. This indicator is on approximately 2 seconds. This time is adjusted at the factory and allows all DC voltages used in the PLC to stabilize at their proper levels before enabling the Processor.

CAUTION: Never exchange a Power Control Module (Cat. No. 1774-PC) with a Power Supply Monitor Module (Cat. No. 1774-PJ), or vice versa. Equipment damage or improper operation results.

14.0 Fuses — A 7 ampere fuse protecting the AC input circuit is located near the sockets on the Local Power Supply. (See Figure 2.)

On the Series A Power Supply, there is an additional 1/4 ampere fuse, protecting the Power Control Module. It is located directly above the AC input fuse.

Table A lists recommended types to be used for ordering replacement fuses.

Table A

LOCAL POWER SUPPLY FUSES ¹

FUSE	BUSSMANN PART NO.	LITTLEFUSE PART NO.	A-B PART NO.
7 ampere	—	3AB 31407	710039-50
1/4 ampere	250V AGC 1/4	312.250	710039-05
¹ Or equivalent.			

15.0 Series C Shutdown Signal — Of all versions, only the Series C Supply is capable of providing a shutdown signal to a Remote I/O Adapter Module which may be the current Bulletin 1771 Module or future enhancements of the Bulletin 1778 Module. (At the time of the publication of this document, only the Cat. No. 1771-AR Remote Adapter Module requires this signal for proper operation. Future developments may extend to other modules including Bulletin 1778 Adapter Modules.)

The shutdown signal is available on all 4 sockets of the Local Power Supply; these are labeled I/O. (It is not available at the socket labelled INTERLOCK, I/O.)

Note that the current Cat. No. 1778-AR PLC Remote I/O

Adapter Module is **not** capable of accepting the shutdown signal from the Series C Supply at the INTERLOCK terminal on the Module. Should any attempt be made to make a connection including the shutdown signal between a Series C, or later, Supply to a current Cat. No. 1778-AR Module, the Module terminates all communication with the Processor. The red RACK FAULT indicators on the I/O Rack, the Module, and the Remote I/O Distribution Panel illuminate. For proper operation, the signal must be removed from the Module.

Do not, however, confuse the above-noted information with the Cat. No. 1778-AR Module's use with a Remote Power Supply (Cat. No. 1778-P2). In this case, the Remote I/O Adapter Module is capable of accepting a shutdown signal from the Supply through the Remote Shutdown Cable (Cat. No. 1778-AK).

16.0 Series C Update — Both the Series B and A Local Power Supplies may be factory updated to include the shutdown signal. When a Series B Supply is reworked to a Series C level, because only a single addition is involved, it becomes identical to a Supply built as a Series C. An appropriate nameplate label change will be made.

Because the Series A Local Power Supply is so different from the Series B, a factory update is limited to the addition of the shutdown signal. Otherwise operational characteristics are identical to the unmodified Series A. Thus the nameplate label change will be modified to Series A1.

The factory update will be available to users under Cat. No. 1774-U11. The supply **must** be returned to Allen-Bradley for the rework to be performed. **1**

BULLETIN 1771 APPLICATIONS

17.0 Bulletin 1771 Compatibility — The Series C Bulletin 1774 Local Power Supply may be used to power a Bulletin 1771 I/O Rack when the Rack is used in conjunction with a Bulletin 1774 PLC controller. (Users should keep in mind that **initially** the choice of a power supply should be in favor of the Bulletin 1771-P2 Auxiliary Power Supply. It is the most economical, compact source of power for a Bulletin 1771 Rack.)

However there may be instances when a user is extending his PLC controller with Bulletin 1771 I/O Racks. Since the Bulletin 1774 Local Power Supply is capable of powering 4 Bulletin 1771 Racks, its use to power a Bulletin 1771 I/O Rack is practical.

18.0 Connections — In order to connect a Bulletin 1774 Local Power Supply with a Bulletin 1771 I/O Rack, one of two optional cables must be ordered. These are:

- Power Cable, 3 ft. (Cat. No. 1771-CG)
- Power Cable, 8 ft. (Cat. No. 1771-CF)

The panel layout of the application determines the choice.

One end of the Cable connects to one of the sockets marked I/O on the Power Supply. (Never connect the Cable to the INTERLOCK/I/O socket because the shutdown signal is **not** available there.) The other connects to a 9-pin socket on the Bulletin 1771 Chassis backplane. **2**

Note that these Cables are fully compatible with the Series C, or later, Local Power Supplies.

19.0 Loading Requirements — The Local Power Supply provides a maximum current output of 35 amperes on its 5-volt circuit. Users must total the current drawn by the mix of modules actually being used by the application in order to determine how many Power Supplies of which type are needed. The Supply shuts down if the over-current shutdown limit is exceeded. Refer to Table B for

Table B
TYPICAL I/O RACK MODULE CURRENT REQUIREMENTS

MODULE TYPE	Cat. No.	5V CURRENT REQUIREMENTS (TYPICAL)		
Local I/O Adapter	1778-AL	1.0A		
Remote I/O Adapter	1778-AR	0.7A		
Pulse Output	1778-OJ	2.0A		
Encoder/Counter	1778-IJ 1778-IK	1.2A		
Analog Input	1778-IE 1778-IF	1.3A		
Analog Output	1778-OE 1778-OF	0.85A		
Digital Input (TTL, AC and DC Input Modules)	1778-IA 1778-IB 1778-IC 1778-ID 1778-IG 1778-IM 1778-IN 1778-IP	0.09A		
		No Outputs ON	Half Outputs ON	All Outputs ON
DC Output (12-24V, 48V, 125V)	1778-OB 1778-OC 1778-OS	0.14A	0.165A	0.19A
DC Power Output (12-24V, 48V, 125V)	1778-OH 1778-OK 1778-OL	0.14A	0.23A	0.32A
TTL Output	1778-OG	0.14A	0.203A	0.266A
Isolated AC Output	1778-OD	0.08A	0.165A	0.25A
AC Output (24V, 48V, 120V, 220/240V)	1778-ON 1778-OP 1778-OA 1778-OM	0.14A	0.31A	0.48A
DC Power Driver Output (12-24V, 48V)	1778-OQ 1778-OR	0.23A	0.27A	0.31A
Pilot Light Driver	1778-OT	0.31A	0.36A	0.41A
DC Puller Logic Output	1778-OV	0.19A	0.24A	0.31A
Contact Output	1778-OY	0.21A	0.35A	0.48A

1 At the time of the publication of this document, the factory update Cat. No. 1774-U11 was not available. It is expected that it will be available during the third quarter, 1979.

2 For more specific information on connections, refer to Publication 1771-906.

Table C

**TYPICAL BULLETIN 1771 I/O MODULE
CURRENT REQUIREMENTS**

MODULE TYPE	Cat. No.	5V SUPPLY CURRENT (TYPICAL)
Remote PLC Adapter Module	1771-AR	900 mA
AC/DC (120V) Input	1771-IA	74 mA
AC (120V) Output	1771-OA	210 mA ¹
DC Input	1771-IB, -IC, -IH	74 mA
DC Output Driver	1771-OB, -OC	165 mA ¹
¹ Assumes all outputs are ON.		

Bulletin 1778 I/O module current requirements. Refer to Table C for Bulletin 1771 Remote PLC Adapter and I/O module requirements. (When new modules are developed, this Table may be incomplete. Refer to individual product data sheets for this information.)

Note that it is necessary to total the **entire** load of all modules being powered by the Supply. If it is determined that the load on the 5-volt circuit exceeds 35 amperes, use an additional Power Supply, preferably a Bulletin 1771.

Keep in mind that the total current drawn by the Bulletin 1771 I/O modules and the more common Bulletin 1778 digital I/O modules is relatively small. Overloading is normally a factor when numbers of special-purpose Bulletin 1778 I/O modules are being used.

20.0 Switch Setting – When a Bulletin 1774 Local Power Supply is connected to a Bulletin 1771 I/O Rack, Switch No. 7 of the Switch Group Assembly in the I/O Rack must be set to ON. ² (Remember that the Power Supply must be Series C, or updated to Series C, to provide the shutdown signal.)

CAUTION: If Switch No. 7 is not set to ON when a Bulletin 1774 Local Power Supply is connected, the Bulletin 1771 Remote I/O Adapter Module will not allow any communication with the Processor. In that case the red RACK FAULT indicator illuminates and all outputs are disabled or held in their last state. (The user determines which according to the setting of Switch No. 1 on the Switch Group Assembly.)

CAUTION: If the Power Supply is not Series C, the Adapter Module will not communicate properly with the PLC Processor. The RACK FAULT indicator will also illuminate in this instance. In that case the red RACK FAULT indicator illuminates and all outputs are either disabled or held in their last state. (The user determines which according to the setting of Switch No. 1 on the Switch Group Assembly.)

² Refer to Publication 1771-906.

NOTES



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